

# Visualizing CO<sub>2</sub> Emissions

Clients: Prof. Kevin Gurney, Dr.  
Geoffrey Roest



Mentor: Scooter Nowak

**Kiley Jacobs - Team Leader, Back-End  
Coder**

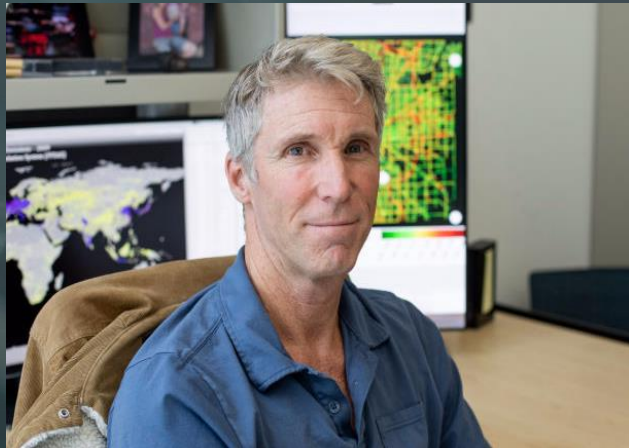
**Tung Nguyen - Recorder, Architect**

**Yisheng Wang - Front-End Coder**

**Zihang Shen - Front-End Coder**



# *Our Clients*



**Professor Kevin Gurney**

- Specializes in atmospheric science, ecology and public policy
- 25 years with UNCCFC

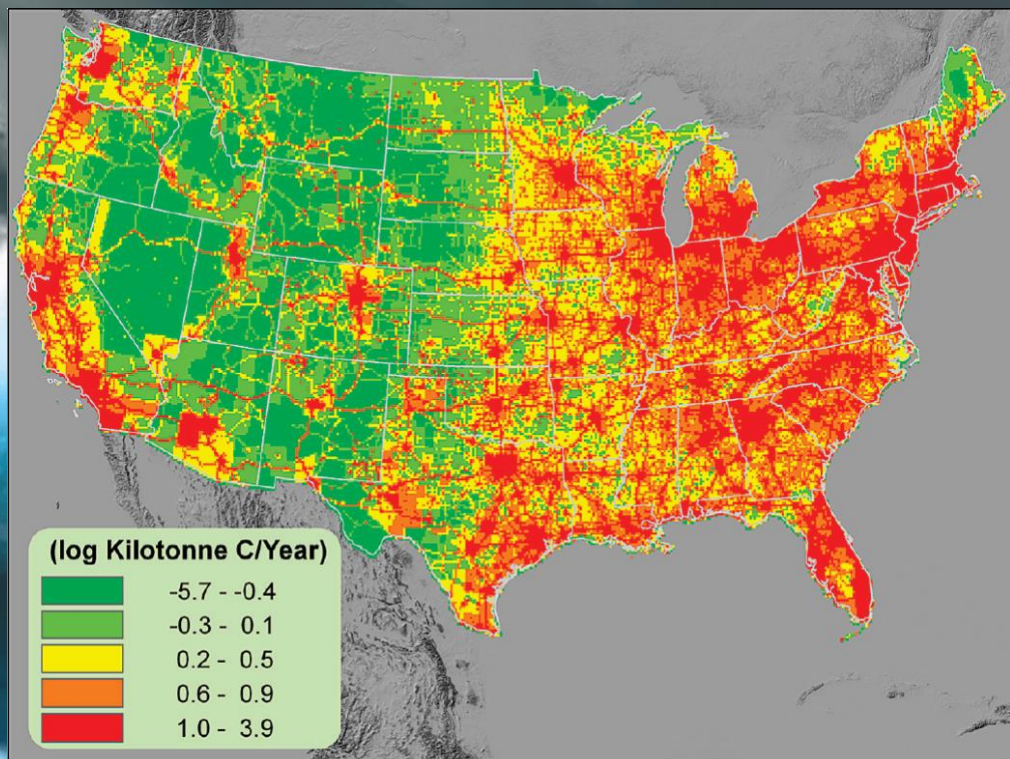


**Doctor Geoffrey Roest**

- Postdoctoral Researcher



# *Our Clients' Work*



- The project has been going on over a decade
- 20-30 TB of data
- Primary sponsor: NASA



# *Problem Statement*

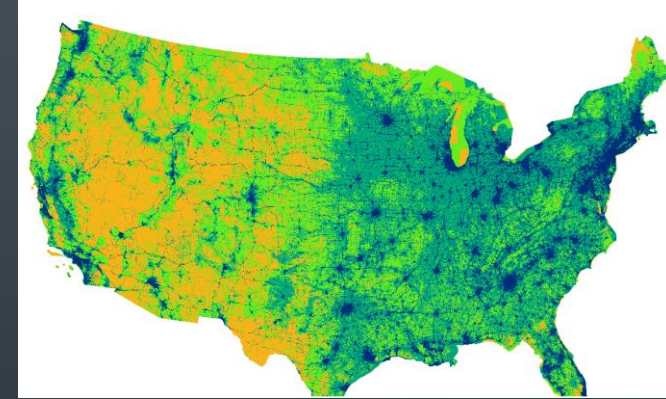
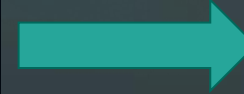
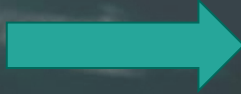
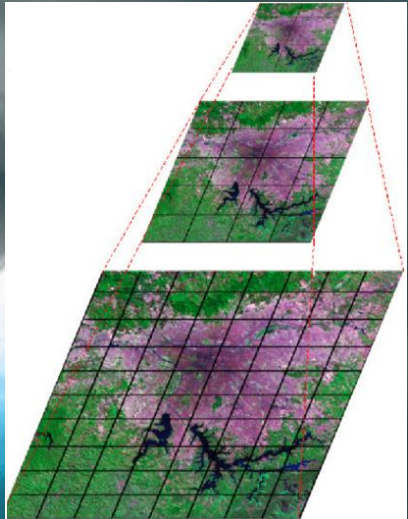
- Data are only available in technical formats
- No user interaction
- Information is hard to interpret and analyze

## *Solution Overview*

- Conversion from static 32 bit float data to unsigned 8 bit
- A Web map application for CO2 emission in U.S.
  - Several different ways for users to interact
    - Switch the map
    - Change color of the map
    - Show the info under the pointer, etc.
- Pages for emission ranking and download



# *Solution Overview*



*And user interaction*

**Raster Data**





# *Key requirements*

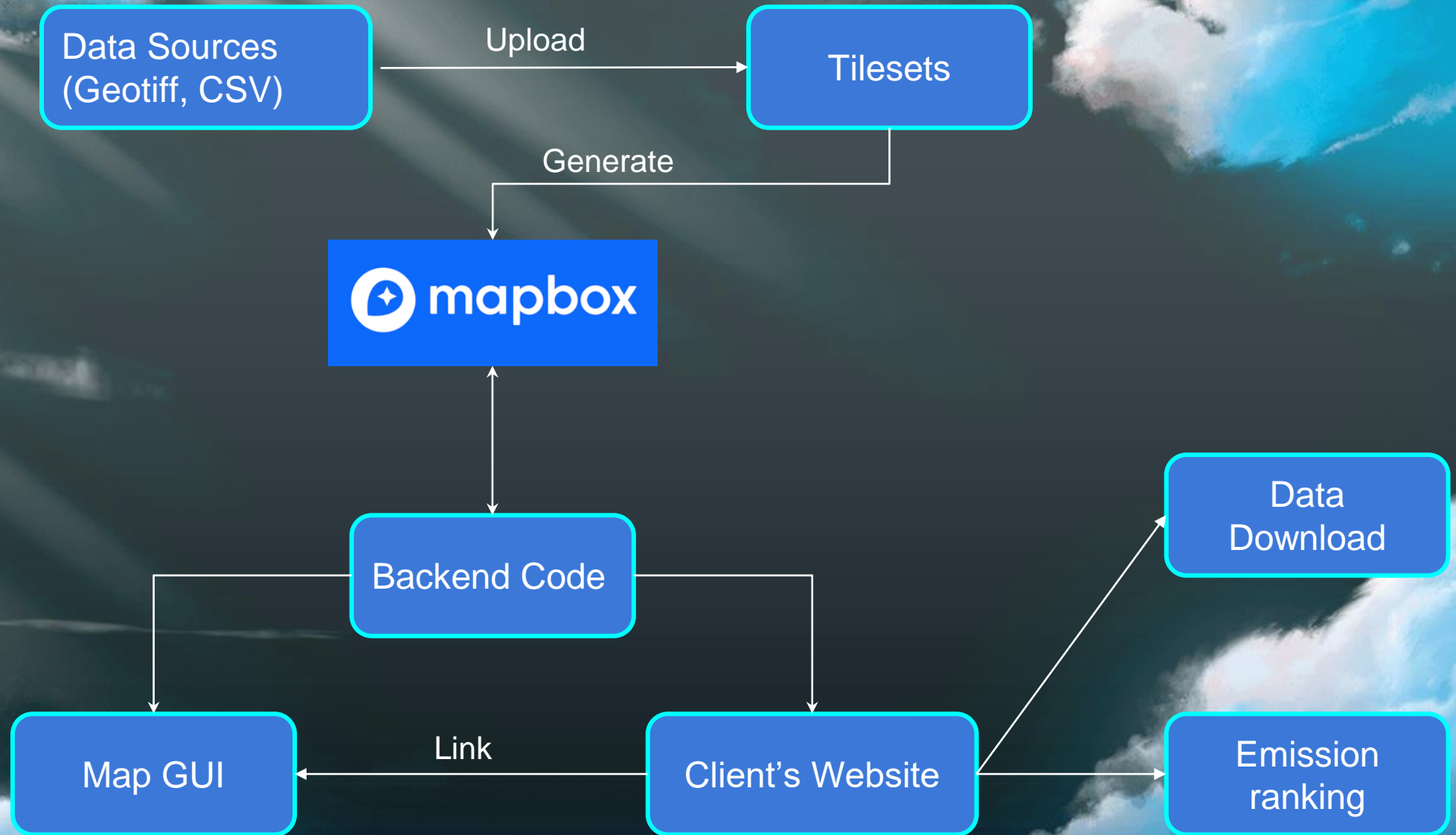
- Display CO2 Emissions data in the form of raster data
- Change colors and transparency of map layers
- View statistical information about a given section of map
- Display data ranking and download

# *Implementation Tools*





# Architecture Overview



# Architecture Overview - Data Sources

< pop-2010 50 features

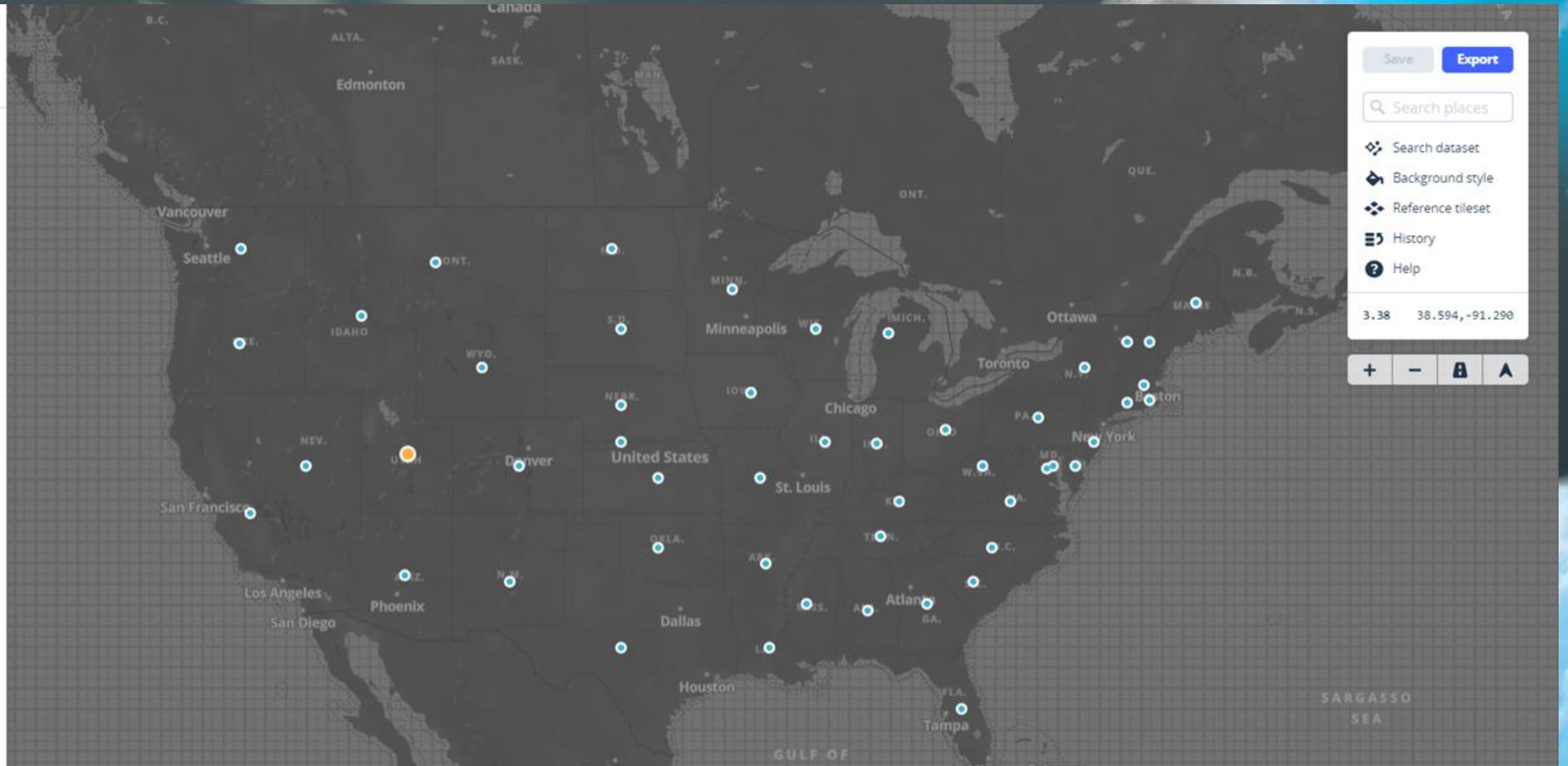
Import

39.500000, -111.500000 1 position

Property (5) GeoJSON

Field	Value
short_code	US-UT
wikidata	Q829
place_name	Utah, United States
title	Utah (Metric Tonnes of CO
description	Population: 2,817,222

+ Add property





# Architecture Overview - Tilesets

pop-2010 50 features

Import

39.500000, -111.500000 1 position

Property (5) GeoJSON

Field	Value
short_code	US-UT
wikidata	Q829
place_name	Utah, United States
title	Utah (Metric Tonnes of CO
description	Population: 2,817,222

+ Add property

### Export to tileset

- Export to a new tileset
- Update a connected tileset

- [Redacted]

**pop-2010**  
14 KB • Modified a day ago • Private

Update tileset

Save Export

Search places

- Search dataset
- Background style
- Reference tileset
- History
- Help

3.38 38.594, -91.290

+ - 🔒 ⬆

# Architecture Overview - Mapbox

Styles > Basic Edited 3 days ago 6.19 34.216, -111.931 Help Light Fonts Images History

Components Layers 56/56

- non-2010
- onr-2010
- res-2010
- com-2010
- ind-2010
- elc-2010
- air-2010
- ral-2010
- cmv-2010
- cem-2010
- pop-2010
- tot-2010

Place labels, place-labels

- country-label
- state-label
- settlement-major-label
- settlement-minor-label
- settlement-subdivision-label

Transit, transit-labels

- airport-label

Point of interest labels, poi-labels

- poi-label

Natural features, natural-labels

- water-point-label
- water-line-label

Components Layers

- non-2010
- onr-2010
- res-2010
- com-2010
- ind-2010
- elc-2010
- air-2010
- ral-2010
- cmv-2010
- cem-2010



# Architecture Overview - Javascript -> GUI



## *Challenges*

- Describe our variables to users
- Change color of map
- Show more than one layer

## *& resolution*

- Change how variables are inputted
- Use CamanJS to change color
- Create a toggle button which has function to (removeLayer) and (addLayer)



## *Challenges solved*

- Switch map to visit different source map.
- Location Search
- Color Label

# Schedule

		Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14	Week 15	Week 16	Week 17		
<b>Team website</b>		Green		Green				NOW												
<b>Map GUI</b>	<b>Change layer</b>	Green	Green	Green	Green	Green	Green			Blue										
	<b>Map switch by different source</b>	Green	Green	Green						Blue										
	<b>Associate CO2 emission with color</b>	Green	Green	Green	Green	Green	Green			Blue										
	<b>Show info. under mouse pointer</b>	Green	Green	Green	Green	Green	Green			Blue										
	<b>Location search</b>	Green	Green	Green	Green															
<b>Website</b>	<b>Emission ranking</b>								Blue	Blue										
	<b>Data download</b>								Blue	Blue										
<b>Function testing</b>	<b>Time slider test</b>									Blue	Blue	Blue	Blue							
	<b>Location Search test</b>									Blue	Blue	Blue	Blue							
	<b>Map switch test</b>									Blue	Blue	Blue	Blue							
	<b>Website test</b>									Blue	Blue	Blue	Blue							
	<b>info. under mouse pointer test</b>									Blue	Blue	Blue	Blue							
<b>Final Build</b>												Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	

Green: things already completed    Red: things in process    Blue: things in the future



# *Conclusion*

Problem: Our clients have lots of technical data they wish for people to see, but is not easily accessible

Solution: Create an interactive map that is easy for users to use, interpret, and provide analysis

Plan: Work towards finishing our prototype, and finalize testing after spring break

*Questions?*



(Website)